**Table 2 Top 10 sentiment phrases based on occurrence**

**Phrase Type Occurrence**

not worth NOA 26329

not go wrong NOA 15446

not bad NOA 15112

not be happier NOA 14892

not good NOA 12919

don’t like NOV 42525

didn’t work NOV 38287

didn’t like NOV 21806

don’t work NOV 10671

don’t remember NOV 9670

(2)

*Occurrencei(t)* is *t*’s number of occurrence in *i*-star reviews, where *i*=1,….,5. According to Figure 3, our dataset is not balanced indicating that different number of reviews were collected for each star level. Since 5-star reviews take a majority amount through the entire dataset, we hereby introduce a ratio,which is defined as:

(3)

In equation 3, the numerator is the number of 5-star reviews and the denominator is the number of *i*-star reviews, where *i* = 1,…..,5. Therefore, if the dataset were balanced, would be set of 1 foe every *i*. Consequently, every sentiment score should fall into the interval of [1,5]. For positive word tokens, we expect thwt the median of their statement scores should exceed 3, which is the point of being neutral according to figure 1. For negative word tokens, it is to expect that the median should be less then 3.